

AMENDMENTS TO THE SPECIFICATION

Please replace the following paragraph beginning on page 6, line 14, with the following amended paragraph:

a1
The controller 100 includes a processor 106 and associated memory 108 (RAM and non-volatile NVRAM). Desirably, the inventive computer program (media surface scanner ~~109~~ 109-1 or 109-2) is stored in NVRAM, or other non-volatile memory) so that the program is retained in the event of loss of power to the controller 100. Copies of the inventive computer program may also or alternatively be stored within the storage device so that it may be read into a controller and executed. As used herein, metadata refers to data that describes or is used to manage the user data contained on the disk drives or other storage devices.

Please replace the following paragraph beginning on page 8, line 12 & line 13, with the following amended paragraph:

a2
As described earlier, sector scanning is preferably performed as a background processing operation by the controller 100 so as not to negatively impact normal I/O operations to the storage device 104. In one embodiment, background scanning and defect analysis is initiated when the storage controller (or processor that is to perform the analysis) workload falls below a preset threshold. This threshold may be fixed, programmable, dynamically adjustable, or set according to any other rules or algorithm. Typically, the threshold is set at between about 60% of capacity and about 80% of capacity for systems that are known to have a high utilization rate, more usually between about 40% of capacity and about 60% of capacity for systems having more moderate utilization rates, and in one particular embodiment at about 50% of capacity. Desirably, the media surface scanner ~~109~~ 109-1 or 109-2 will traverse all sectors on the media so that any media defect wherever located can be identified; however, it will be appreciated that the media surface scanner ~~109~~ 109-1 or 109-2 may be controlled so as to scan only selected portions of the media, to skip particular portions of the media, to scan selected portions of the media more or

Q2 less frequently than other portions, or directed to scan according to other predetermined or programmatically constrained rules.

Please replace the paragraph beginning on page 8, line 17 & 18, with the following paragraph:

Q3 Two different embodiments of media surface scanner ~~109~~ 109-1 or 109-2 are now described. In a first embodiment 109-1, sectors not previously written to by the host computer 102 are scanned. Sectors that do not store RAID array control metadata may also or alternatively be scanned according to this method.

Please replace the paragraph beginning on page 9, line 17 with the following paragraph:

Q4 FIG. 5 illustrates the sequence of steps or procedures executed to practice a second embodiment of the method wherein in the media surface scanner ~~109~~ 109-2, the scanning is performed for sectors that have previously been written to by the host, and alternatively or additionally to sectors that do store array control metadata. In this embodiment, the controller 104 reads each of the sectors (step 300) and temporarily stores the data read (step 302). The read operation may optionally be performed with drive error recovery capability reduced or disabled. If no errors are detected during the read phase of the test (step 306), the controller 100 will write back the read data to the sector (step 304). This is a non-destructive write test. If no errors are detected no further action is required. However, if a recoverable media error or unrecoverable media error was reported on a sector, a defect management procedure is invoked (step 306) that reallocates the sector. If the error was unrecoverable, then the controller recreates the data from redundant information using RAID techniques known in the art (step 307). The controller then initializes the reallocated sector for host use (step 308) by writing the saved or recreated host data and replaces the defective sector with the reallocated sector (step 310).

Please replace the paragraph beginning on page 10, line 8, with the following amended paragraph:

25 In either embodiment, the media surface scanner ~~109 tracks~~ 109-1 and 109 -2 track errors encountered and reallocations performed and if pre-set (or otherwise determined) thresholds are exceeded the storage controller 100 may optionally notify a storage system's administrator so that the media itself can be replaced. For example, a RAID disk drive having a number of errors that exceeds such pre-set error thresholds may be swapped out and replaced by a replacement drive. Techniques for rebuilding such RAID storage systems are known in the art and not described in detail here. In another embodiment the controller 100 may automatically replace a RAID disk drive having a number of errors that exceeds a preset error threshold with a spare disk drive. A spare disk drive is a disk drive in a RAID storage system that is available to replace failed disk drives.
